

Oceans in grave danger, scientists warn; UN panel spells out growing impact on coastal cities and marine life as temperatures rise

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Byline: Chris Mooney and Brady Dennis The Washington Post

Body

Climate change is already causing staggering impacts on the oceans and ice-filled regions that encompass 80 per cent of the Earth, and future damage from rising seas and melting glaciers is now all but certain, according to a sobering new report from the United Nations.

The warming climate is already killing coral reefs, supercharging monster storms and fuelling deadly marine heat waves and record losses of sea ice. Wednesday's report on the world's oceans, glaciers, polar regions and ice sheets finds that such effects only foreshadow a more catastrophic future as long as greenhouse gas emissions remain unchecked.

Given current emissions levels, a number of serious impacts are essentially unavoidable, says the report of the Intergovernmental Panel on Climate Change.

Extreme floods that have historically struck some coastal cities and small island nations once every 100 years will become an annual occurrence by 2050, according to the IPCC. In addition, if emissions continue to increase, global sea levels could rise by more than a metre by the end of this century - about 12 per cent higher than the group estimated as recently as 2013. Melting glaciers could harm water supplies, and warming oceans could wreck marine fisheries.

"As a result of excess greenhouse gases in the atmosphere, the ocean today is higher, warmer, more acidic, less productive and holds less oxygen," said Jane Lubchenco, a former administrator of the U.S. National Oceanic and Atmospheric Administration (NOAA). "The conclusion is inescapable: The impacts of climate change on the ocean are well underway. Unless we take very serious action very soon, these impacts will get worse - much, much worse."

More than 100 scientists from around the world contributed to the latest report by the IPCC, which found that profound and potentially devastating consequences lie ahead for marine life, Arctic ecosystems and entire human societies if climate change continues unabated.

Wednesday's report comes on the heels of other IPCC warnings about the grave threats posed by climate change. Recently, the group detailed how the world's land and water resources are facing "unprecedented" levels of exploitation and how those changes endanger the global food supply. Last fall, the IPCC also warned that the world must make rapid, sweeping changes to energy, transportation and other systems to hold warming below an increase of 1.5 C, a key threshold singled out in the Paris climate agreement.

The findings also come as world leaders gathered this week at the United Nations for a much-anticipated "climate summit" aimed at injecting new momentum into the flagging effort to persuade countries to do more to move away

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from fossil fuels and toward cleaner forms of energy. While dozens of smaller nations did unveil plans for coming years, the world's largest emitters have stopped short of committing to transformational changes.

"The climate emergency is a race we are losing - but it is a race we can win if we change our ways now," UN Secretary-General Antonio Guterres told world leaders on Tuesday in his latest attempt to spur action.

One of the document's most striking findings involves the rise in sea level, which is now being driven mainly by the rapid melting of ice in Greenland, Antarctica and the world's smaller glaciers. Sea level rise is accelerating, and the world could see 1.1 metres in total sea level rise by the year 2100 in a very high-emissions scenario. In 2013, the IPCC had estimated that value at less than a metre.

But the truth is that even these estimates may be too small, because when scientists behind the report looked at an alternative method for gauging how much seas could rise - simply canvassing the views of experts - even larger estimates emerged. The group's findings only highlight "likely" amounts of sea level rise, meaning they do not represent worst-case scenarios.

For some major coastal cities, a historical 100-year flood event will happen annually by the year 2050. That includes large cities such as Jakarta, Manila, Bangkok, Lima, Singapore, Barcelona and Sydney, the report says.

"It doesn't matter where you live in the world or where you live in Canada. The impacts of climate change are going to impact everyone," said Sherilee Harper, an epidemiologist at the University of Alberta and one of the report's lead authors.

Oceans are becoming more acidic and warmer at a pace that has doubled since 1993. Oxygen is disappearing from their upper layers and currents that bring warm water north are weakening.

Glaciers, the source of rivers, are shrinking. Permafrost, which stores twice as much carbon as the atmosphere, is at record temperatures.

The changes are affecting people. For example, there have been outbreaks of vibrio poisoning, causing gastrointestinal illness, from shellfish living in warm water. Arctic communities will be directly affected.

"For both the Arctic and west of B.C., the report talks about how the decreased catch of fish and seafood will impact nutrition for the people who live there," Harper said. "We'll see anywhere from a 20 to 30 per cent decrease in their nutrient intake because of those climate change impacts on fish distribution."

By 2060 - within the lifetime of about half of Canadians now living - coastal floods off British Columbia and the Maritimes that used to occur once a century will be annual events.

Water availability across Western Canada will be disrupted.

Crucial kelp forests and seagrass meadows that shelter thousands of species from fish to seals to seabirds off both east and west coasts are threatened.

And while animals in Arctic seas are expected to increase, that comes at the price of dramatic declines everywhere else in the world.

Paris Mayor Anne Hidalgo, who chairs C40 Cities, a global group of climate-conscious city leaders, called Wednesday's report "shocking reading."

"The world's coasts provide a home to around 1.9 billion people and over half of the world's megacities - all of which are in grave danger if we don't act immediately to prevent rising temperatures and sea levels," Hidalgo said in a statement. "Extreme high temperatures, coastal flooding and more frequent natural disasters are becoming the new normal ... This is what the climate crisis looks like now."

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Like coastal cities, various small island nations also face imminent dangers from rising seas and as a result have been among the most vocal in pushing for more aggressive climate action.

Because sea level rise greatly amplifies storm surge events, "flood levels are all of a sudden returning in many cases once a year by mid-century, and it just gets worse from there," said Michael Oppenheimer, a Princeton climate scientist who led the report's chapter on sea level rise. "We're talking about storms that, when they come, result in loss of life, loss of property, shut down cities."

Granted, the severity of a 100-year flood event varies greatly and will not always be disastrous in any one place, Oppenheimer said. Still, the finding underscores just how big a difference a steady rise in sea level can make - and how soon we are going to start to realize this.

Wednesday's report also finds that while it may be possible to adapt to rising seas if global emissions are somehow kept low throughout the century, the system could still tip toward very large ice losses from Greenland and Antarctica. If that happens, the rate of sea level rise could become truly catastrophic, especially by the years 2200 and 2300, when it could exceed three metres.

Ice loss is accelerating in Greenland and Antarctica, scientists found. Summer Arctic sea ice extent is now probably lower than at any time in "at least 1,000 years," and the oldest, thickest ice has already declined by 90 per cent.

Many of these changes to oceans and ice are unfolding in parts of the Earth where few people live, and so the shifts are not always readily visible to most humans. But the changes taking place there ultimately will affect people around the globe, in the form of rising seas and other impacts. And as those impacts worsen, so does the difficulty of adapting to them.

"People at the poles are experiencing climate change frequently, much more than the rest of us," said Ted Schuur, one of the drafting authors of the report and a permafrost expert at Northern Arizona University. "But I think that's in our future. Everybody living outside of these polar regions is going to start having these same effects."

Lynn Scarlett, the vice-president for policy and government relations at the Nature Conservancy and a top-ranking Interior Department official during the George W. Bush administration, said the grim findings in Wednesday's report should be a call to action.

"We must not let these climate change impacts paralyze us," she said in an email. "We must address root causes of climate change by slowing and eventually stopping accumulation of greenhouse gas emissions."

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